

HOUSING WITH DEVICE FOR ELECTRONIC CONTROL UNITS, IN PARTICULAR IN MOTOR VEHICLES

Field Of The Invention

The present invention relates to a housing for electronic control units, in particular in motor vehicles, having a bottom section for attaching the electronic control units and having a cooling device that enables heat to be dissipated from the housing via a liquid flowing through.

Background Information

Electronic control units must be cooled in order for them to operate correctly. This is especially true of those electronic control units that are operated in areas subjected to high temperature, such as the engine compartment of a motor vehicle. Due to these special temperature conditions, electronic control units have customarily been mounted at points in the vehicle that are subjected to less heat or on separate heat sinks.

A housing of the type mentioned above is described in European Patent Application No. EP 0 968 885. In this previously known housing, the bottom section is provided with a recess for inserting an electronic control unit, the cooling device having cooling channels that are shaped to be open in the vicinity of three side edges of the recess and are closed by a separate cover. Additional method steps, such as welding on a cover or screwing on a cover to form a seal, are necessary to produce these cooling channels. One disadvantage of this previously known housing is that it provides inadequate cooling efficiency because heat is mainly dissipated only at three side edges of the recess for the electronic control unit.

Summary Of The Invention

Consequently, an object of the present invention is to provide a housing which combines the advantages of low-cost manufacturing with a high cooling capacity.

Based on the design according to the present invention, a housing having an integrated cooling device is advantageously provided which enables electrical control units to be operated in areas subjected to high temperatures, for example in the engine compartment of a motor vehicle. Integrating the cooling device into the bottom section establishes ideal conditions for transferring heat between the electronic control unit and the cooling device, making it possible to achieve especially effective cooling.

At the same time, the object of the present invention advantageously establishes the conditions for simplifying the cooling channel geometry so that the bottom section may be manufactured in a single step, for example by lost-wax casting.

The production costs may be advantageously lowered by reducing and standardizing the necessary manufacturing steps, and the housings for electronic control units may be designed flexibly and in a manner that improves performance due to greater heat dissipation.

Brief Description Of The Drawings

Figure 1 shows a perspective top view of a bottom section of a housing for electronic control units, according to an exemplary embodiment of the present invention.

Figure 2 shows a perspective view of the bottom section illustrated in Figure 1, seen from below.

Figure 3 shows a sectional view along line of intersection III-III in Figure 1.

Detailed Description

Figures 1 through 3 show only an approximately rectangular bottom section of the housing for electronic control units, in particular in motor vehicles, having three fastening points 11 on the vehicle side and four through-holes 11' that are located in the four corners for screw attachment to a cover that is not illustrated, as well as a p.c. board that is also not illustrated. In its center, bottom section 10 accommodates,

as the cooling device, a cooling channel 12 that has a linear design and is manufactured in a single piece with bottom section 10. At opposite ends of bottom section 10, cooling channel 12 empties into threaded connectors 13 and 14, respectively, to which hoses or pipes may be connected for supplying and discharging the cooling liquid, in particular water or fuel, to and from the cooling device.

As is clearly illustrated in the perspective bottom view shown in Figure 2, sectional members 15, 16, 17, etc., which help conduct heat and reinforce bottom section 10, are provided on the outside of cooling channel 12. Bottom section 10 is thus designed as a cooling plate.

The bottom section is manufactured by injection molding, preferably die-casting, the geometry of cooling channel 12 being produced during casting by two sliding members that meet in the middle. This advantageously seals cooling channel 12 as early as in the first step of the production process.

Cooling channel 12 preferably has a round cross-section. Alternatively, the cross-section may be provided with an oval, approximately square or rectangular or any other easily manufacturable shape that has a large surface area to facilitate heat transferability and mechanical rigidity.

Alternatively, multiple separate cooling channels that are either connected separately or via an additional cross hole may be provided in the bottom section or cooling plate instead of a single cooling channel 12. Cooling channel 12 or multiple cooling channels simultaneously reinforce bottom section 10 and thus also the housing, thereby improving vibration properties.

To help achieve a good and effective cooling performance, the cross-section of cooling channel 12 may also be dimensioned for high liquid throughput and thus efficient heat dissipation.